No. of Printed Pages : 4

BME-060

DIPLOMA IN MECHANICAL ENGINEERING (DME)

Term-End Examination

00374

June, 2017

BME-060 : MACHINE DESIGN

Time : 2 hours *Maximum Marks : 70*

Note : *Answer **five** questions in all. Question no. **1** is **compulsory**. Use of scientific calculator is permitted.*

1. Choose the correct answer. *7×2=14*

(a) The deflection of the shaft at the centre is given by

(i) $\delta = 3\ Pl/48\ EI$

(ii) $\delta = Pl^2/48\ EI$

(iii) $\delta = Pl^3/84\ EI$

(iv) $\delta = Pl^3/48\ EI$

(b) Izod and Charpy impact testing machines are used to measure

(i) Stiffness

(ii) Hardness

(iii) Toughness

(iv) Resilience

(c) The Surface roughness of cylindrical grinding process is

(i) 10 microns

(ii) 2·5 – 0·25 microns

(iii) 5 – 3·0 microns

(iv) 6·25 – 2·5 microns

(d) Following is the property of a material which shows negligible plastic deformation before fracture takes place :

(i) Plasticity

(ii) Elasticity

(iii) Brittleness

(iv) Malleability

(e) All ductile materials are also malleable but the converse is

(i) True

(ii) Not true

(iii) Sometimes true

(iv) Statement is not correct

(f) The fits H6 – f6, H7 – f7 and H8 – f8 are used for

(i) Loose pulleys

(ii) High speed bearings

(iii) Shafts of gearboxes

(iv) Precision equipments

(g) Tool steels have carbon content

(i) Less than 0·3%

(ii) 0·3% ~ 0·5%

(iii) 0·5% to 2%

(iv) 2% and above

2. Briefly explain the following : *14*

(a) Interchangeability

(b) Fits and Tolerances

3. Explain the different types of keys and give their applications. *14*

4. Draw the Stress – Strain diagram for ductile materials and explain the various points in the diagram. *14*

5. Sketch and discuss the various types of welded joints used in pressure vessels. What are the design considerations for welded joints ? *14*

6. Discuss the function of a coupling. Explain about muff coupling with a neat diagram. *14*

7. The standard cross-section for a flat key, which is fitted on a 50 mm diameter shaft, is 16 mm × 10 mm size. The key is transmitting 475 N/m torque from the shaft to the hub. The key is made of commercial steel ($S_{yt} = S_{yc} = 230$ N/mm^2). Determine the length of the key, if the factor of safety is 3. *14*